UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/458,139	12/09/1999	YI-MIN WANG	200730	8486

7590 02/09/2004	**EXAMINER**
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ART UNIT	PAPER NUMBER
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DATE MAILED: 02/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2003*.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1 – 46 are pending in the application.

Response to Arguments

2.   Applicant's arguments with respect to claims 1 - 46 have been considered but are

moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   **Claims 1, 2, 4, 5, 14-18, 24, 25, 27, 28 and 37-41 are rejected under 35 U.S.C.**

103(a) as being unpatentable over "The Impact of Inexpensive Communication on

a Commercial RPC System" (hereinafter Zimmer) in view of "Virtual Interface

Architecture Specification, Revision 1.0" (hereinafter VIA).

5.   As to claim 1, Zimmer teaches the invention substantially as claimed including a

method of communication (Microsoft RPC, MSRPC on Fast Messages; Section 3, p. 4)

between a first object located on a first computer having a first memory location (client

stub application, Section 2.2, p. 3) and a Remote Procedure Call run-time layer

(MSRPC runtime, Section 2.2, p. 3), wherein the RPC run-time layer have access to an

RPC buffer (buffers are preposted to message queues, first paragraph, p. 5), and a

second object located on a second computer (server stub application, Section 2.2, p. 3),

the first and second computers connected by a network (System-area networks; Section

2.3, p. 4), accessed by the first computer through a network interface card on the first

computer (FM 2.1 exploits Myrinet hardware to achieve one-way latencies; Section 2.3,

p. 4), the method comprising:

calling an interface of the second object with the first object (DCOM provides

remote invocations through COM interfaces, Section 2.1, p. 2); and

transmitting, by the network interface card, the first parameter pointed to by the

first pointer by reading the first parameter out of the first memory location (buffers can

be preposted to message queues, enabling network data to be moved directly into

marshalling buffers for the RPC, avoiding both memory management overhead and

data copies, first paragraph, p. 5).

6.   Zimmer does not teach placing in the RPC buffer a first pointer to a first

parameter and treating, in the RPC run-time layer, the first pointer as a scatter-gather

entry.

However, VIA teaches (p. 12 – 13, Section 2.1.1. Virtual Interfaces) placing in the

buffer (send queue) a copy of a first pointer (Descriptor is a data structure that contains

all of the information that the VI Provider needs to process the request, such as pointers

to the data buffers) to a first parameter (data stored in the data buffers), the network

interface card transmitting the first parameter pointed to by the first pointer by reading

the first parameter out of the first memory location (VI NIC directly performs data

transfer functions), and treating the first pointer as a scatter-gather entry (p. 30, Section

6.1.1.1. Scatter-Gather Considerations).

7.   It would have been obvious to a person of ordinarily skilled in the art to apply the teaching of placing in the buffer a copy of a first pointer to a first parameter, transmitting the first parameter by the network interface card as taught by VIA to the invention of Zimmer because it would avoid intermediate copies of the data and bypasses operating system to achieve low latency, high bandwidth data transfer.

8.   As to claim 24, this is a product claim that corresponds to method claim 1; note the rejection of claim 1 above, which also meets this product claim.

9.   As to claim 14, Zimmer as modified by VIA teaches the invention substantially as claimed including a method of communication (Microsoft RPC, MSRPC on Fast Messages; Section 3, p. 4 of Zimmer) between a first object located on a first computer having a first memory location (client stub application, Section 2.2, p. 3 of Zimmer) and a Remote Procedure Call run-time layer (MSRPC runtime, Section 2.2, p. 3 of Zimmer), wherein the RPC run-time layer have access to an RPC buffer (buffers are preposted to message queues, first paragraph, p. 5 of Zimmer), and a second object located on a second computer (server stub application, Section 2.2, p. 3 of Zimmer), the first and second computers connected by a network (System-area networks; Section 2.3, p. 4 of Zimmer), accessed by the first computer through a network interface card on the first computer (FM 2.1 exploits Myrinet hardware to achieve one-way latencies; Section 2.3, p. 4 of Zimmer), the method comprising:

receiving, by the network interface card, a parameter of the call from the first

object (a receive queue... VI Consumers post request, in the form of Descriptors, on the

Work Queues to send or receive data, p. 12 – 13, Section 2.1.1. of VIA);

receiving, by the network interface card, a parameter of the call from the first

object (VI NIC directly performs data transfer functions, p. 12 – 13, Section 2.1.1. of

VIA);

storing, by the RPC run-time layer (MSRPC runtime, Section 2.2, p. 3 of

Zimmer), the parameter in a memory location (receive queue contains Descriptors that

describe where to place incoming data, p. 10 of VIA); and

accessing, by the second object, the parameter (VI Providers asynchronously

process the posted Descriptors and mark them with a status value when completed, first

paragraph, p. 13 of VIA).

10.   As to claim 37, this is a product claim that corresponds to method claim 14; note

the rejection of claim 14 above, which also meets this product claim.

11.   As to claims 2 and 25, Zimmer as modified teaches (p. 15, first paragraph of VIA)

issuing a notification on the first computer after the network interface card has finished

reading the first parameter out of the first memory location (the Send/Receive model of

data transfer requires that the VI Consumers be notified of Descriptor completion at

both ends of the transfer).

12.   As to claims 4 and 27, these claims are drawn to placing one or more pointers in

the buffer and the network interface card transmitting the parameters that the pointers

point to. Zimmer as modified teaches the buffer (send queue, p. 10 of VIA) contains

one or more pointers (Descriptors that describe the data to be transmitted, p. 10 of VIA)

and asynchronously processing the posted Descriptors (p. 13 of VIA). As to RPC buffer

and scatter-gather entry, see the rejection to claim 1 above.

13.   As to claims 5 and 28, these claims are drawn to issuing a notification on the

sending computer each time the network interface card has finished reading a

parameter. Zimmer as modified teaches (p. 15, first paragraph of VIA) the

Send/Receive model of data transfer requires that the VI Consumers be notified of

Descriptor completion at both ends of the transfer.

14.   As to claims 15, 16, 38, and 39, Zimmer teaches that the memory location is the

RPC buffer (marshalling buffers for the RPC) and accessing the parameter is performed

in the RPC buffer (buffers can be preposted to message queues, enabling network data

to be moved directly into marshalling buffers for the RPC, first paragraph, p. 5 of

Zimmer).

15.   As to claims 17, 18, 40, and 41, Zimmer as modified teaches the memory

location is the memory storage location (physical memory) and accessing the parameter

in the memory storage location (locking the pages of a virtually contiguous memory

region into physical memory, Section 2.2, p. 14 of VIA).

16.   **Claims 3, 6, 7, 26, 29 and 30 are rejected under 35 U.S.C. 103(a) as being**

unpatentable over Zimmer as modified by VIA further in view of U.S. Patent No.

6,131,126 to Kougiouris.

17.   As to claims 3, 6, 7, 26, 29, 30, Zimmer as modified teaches reclaiming memory

(reuse registered memory buffers, Section 2.2, p. 14 of VIA) but does not specify

reclaiming the memory location after receiving the notification.

18.   However, Kougiouris teaches (column 2, lines 28 – 45) a method in a computer

system for inter-process communication that reclaims a memory location after data

transmission (the first buffer is deallocated upon receipt of the communication).

19.   It would have been obvious to a person of ordinarily skilled in the art at the time

of the invention to apply the teaching of reclaiming a memory location after data

transmission as taught by Kougiouris to the invention of Zimmer as modified because

this prevents large and unnecessary consumption of memory resources.

20.   **Claims 8, 13, 19, 20, 31, 36, 42, and 43 are rejected under 35 U.S.C. 103(a) as**

being unpatentable over Zimmer as modified by VIA further in view of U.S. Patent

No. 6,044,409 to Lim.

21.   As to claims 8, 13, 31, and 36, Zimmer as modified teaches a first send buffer, a

first receive buffer (VI Consumer at the receiving end pre-posts a Descriptor to the

receive queue, first paragraph, p. 15 of VIA), and the first receive buffer is posted to be

of sufficient size to accept the second data (VI Consumer on the receiving side must

post a Receive Descriptor of sufficient size before the sender's data arrives, second full

paragraph, p. 15 of VIA).

22.   Zimmer as modified teaches posting a receive buffer before the data arrives but

does not specify posting on the first computer a first receive buffer prior to sending a

first data to the second computer.

       However, Lim teaches (column 12, lines 19 – 25, 55 – 60, and 64 – 66) posting

on the first computer a first receive buffer prior to sending a first data to the second

computer (a marshal buffer appropriate for the transport selected is created in step 206,

Fig. 4), the first receive buffer will receive a second data from the second computer in

response to the first data (the client receives a reply from the server and encapsulates

the reply in a marshal buffer 216 and 218, Fig. 4), and sending the first data to the

second computer (the contents of the marshal buffer are transmitted over the selected

transport to the identified end point 212, Fig. 4).

23.   It would have been obvious to a person of ordinarily skilled in the art at the time

of the invention to apply the teaching of posting on the first computer a first receive

buffer prior to sending a first data to the second computer as taught by Lim to the

invention of Zimmer as modified because this would ensure that there is memory

available to store the response data.

24.   As to claims 19 and 42, Zimmer as modified teaches storing on the second

computer a second data into a first receive buffer (VI Consumer at the receiving end

pre-posts a Descriptor to the receive queue, first paragraph, p. 15 of VIA), posting a

receive buffer prior to sending data to a computer (a marshal buffer appropriate for the

transport selected is created in step 206, Fig. 4; column 12, lines 19 – 25, 55 – 60, and

64 – 66 of Lim) and the first receive buffer was posted to be of sufficient size to accept

the second data (VI Consumer on the receiving side must post a Receive Descriptor of

sufficient size before the sender's data arrives, second full paragraph, p. 15 of VIA).

25.   As to claims 20 and 43, Zimmer as modified teaches (column 12, lines 55 – 67 of

Lim) the first data from a send buffer to the first computer was sent (transmit contents of

marshal buffer over selected transport to identified end point 212, Fig. 4) prior to

receiving the second data form the first computer (receive reply from server 216, Fig. 4).

26.   **Claims 9 – 12 and 21 – 23, 32 – 35, and 44 – 46 are rejected under 35 U.S.C.**

103(a) as being unpatentable over Zimmer, VIA and Lim further in view of

Kougiouris.

27.   As to claims 9, 11, 21, 23, 32, 34, 44, and 46, Zimmer as modified teaches

cleaning up (deallocated) a send buffer (first buffer) on the computer after sending the

first data and prior to receiving the second data from the second computer (the first

buffer is deallocated upon receipt of the communication; column 2, lines 28 – 45 of
Kougiouris).

28.   As to claims 10 and 33, Zimmer as modified teaches posting a second receive
buffer (marshal buffer) prior to the first receive buffer (a marshal buffer appropriate for
the transport selected is created in step 206, Fig. 4; column 12, lines 19 – 25, 55 – 60,
and 64 – 66 of Lim).

29.   As to claims 12, 22, 35, and 45, Zimmer as modified teaches using a second
send buffer (buffers of a VI Consumer) to send data to a computer (transfer data directly
between buffers of a VI Consumer and the network, Section 2.2, p. 14 of VIA).

Conclusion

30.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Li B. Zhen whose telephone number is (703) 305-3406.
The examiner can normally be reached on Mon - Fri, 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Meng-Ai An can be reached on (703) 305-9678. The fax phone number for
the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Li B. Zhen
Examiner
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February 4, 2004

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